

EXHAUST GAS DEFLECTOR VALVE

Technical Field

5 This invention is directed to an exhaust gas deflector valve for use in an automobile.

Background

10 This invention is directed to an exhaust gas deflector valve for use in an automobile, preferably in relation to an exhaust gas recirculation (EGR) system, having as the main purpose conducting exhaust gas through a heat exchanger that acts as a gas cooler when cooling is required and, when the gas is below the minimum limits for cooling, de-
flecting and thereby recycling the gas directly to the engine, without it passing through the heat exchanger.

15 The gas deflector valve is activated by a vacuum or pressure pneumatic system, preferably by means of a directed valve actuated by an electric signal from the engine's electronic control center.

20 Use of the inventive gas deflector valve assures gas recycling at an optimum temperature, improving or maintaining performance of the internal combustion engine as regards combustion, specific power, specific consumption, transience of operation and control of pollutant emissions. The use of the gas deflector valve reduces the occurrence of gas condensation and, consequently, non-operation of components and accessories of the system for control of pollutant emissions, due to soot, oil, water deposits, and other residues from combustion on the
25 walls of equipment, the heat exchanger, ducts and EGR valve, inlet manifold, nipples and other components.

The invention is best understood with reference to the attached illustrative drawings, with reference to the detailed description below.

Brief Description Of The Drawings

5 The inventive gas deflector valve is described and shown in two versions, different only in the location of the element for blocking/releasing the gas passage.

FIGURE 1 shows the lower view of the gas deflector valve, first version;

10 FIGURE 2 shows a plan view of the gas deflector valve, first version;

FIGURE 3 shows the lower view of the gas deflector valve, second version;

FIGURE 4 shows a plan view of the gas deflector valve, second version;

15 FIGURE 5 shows a schematic representation of the engine cooling system, with the gas deflector valve of the invention.

Detailed Description Of The Invention

20 As can be seen from figures 1 and 2, the first version of the gas deflector valve has a flat block (1) with a specific peripheral configuration. Two adjacent circular openings (2) and (3) define exhaust gas passages, with a lower projection (4) at one end at the opposite end coupled to a support (5) of a vacuum or pressure pneumatic valve (6), equipped with a nipple (7) for connecting to a system hose, the valve subject to the biasing action of a draw spring (8).

25 One of the circular openings (2) has an upper through hole and a lower through hole, to which roller bearings or bushings (9) are assem-

bled for supporting rotation of a shaft (10) perpendicular to the gas flow. The shaft has a lower terminal end which penetrates the lower hole and extends out from a lower part of the block (1). The extended end of this shaft (10) is connected to a plate (11) equipped at the ends with two upper lips (12) that act as limiters of the rotary motion of the shaft, with angular displacement of the plate (11) causing the lips to engage one or another side of a block extension (4).

In an interior of the opening (2) is an element for blocking/releasing the gas passage, defined by a "butterfly" valve (13), riveted to the shaft (10).

Incorporated to the actuator (6) is an axial rod (14) extending throughout a lower length of the block (1). The end of the rod (14) is articulated to the plate (11), whose point of articulation is eccentric to the point of connection of the shaft (10), and therefore, this rod (14) works as a connecting rod, converting the rectilinear motion of the shaft (10) into circular motion, thereby controlling the butterfly valve attached thereto.

The second version of the gas deflector valve set (figures 3 and 4) presents small differences in relation to the first version, such as the fact that the element for blocking/releasing the gas passage, or the "butterfly valve" (13a), is installed in the second circular opening (3) of the block, where the upper and lower through holes are located. Bearings or bushings (9a) support rotation of the shaft by reducing friction on the shaft (10a), located perpendicular to the gas flow and to which the "butterfly" valve (13a) is riveted. In this case, the axial rod (14a) of the vacuum or pressure pneumatic valve (6) is shorter and extends up

to a mid-length of the block (1), which has a shoulder (15) that acts as a top to limit the circular motion, with angular displacement of the plate (11a) causing one or another upper lip (12a) of the plate to engage the shoulder. The working is identical to that of the first version.

5 Figure 5 shows a schematic of the engine cooling system, with the gas deflector valve installed before the inlet of the hot gas of the engine in the gas/water heat exchanger of the EGR system.

10 The inclusion of the gas deflector valve has the advantage that the gas from the engine is only conducted to the heat exchanger of the EGR system when its temperature is above normal and cooling is required. That is, the “butterfly” valve is opened by action of the pneumatic actuator in such a way that the passage of the gas is released toward the heat exchanger of the EGR system. When the gas temperature is below the minimum limits for cooling, the gas is recycled directly
15 to the engine, without passing through the heat exchanger. That is, the “butterfly” valve is activated by pneumatic actuation in such a way as to cause blocking and unblocking to cause a redirection of flow, which details depends on the circuit and layout of the various systems for cooling and control of emissions from internal combustion engines.

20 The inventive gas deflector valve fully satisfies the proposed objectives, performing the functions for which it was designed in a practical and efficient manner, providing a series of advantages inherent to its applicability, and giving it unique and innovative features possessing the fundamental requirements for novelty.

25 What is claimed is: